

# PATENT SPECIFICATION (11)

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## (54) CONTACT BODY FOR USE IN AN ELECTRIC CIRCUIT

(71) We, ROBERT BOSCH GmbH, a German company, of Postfach 50, 7 Stuttgart 1, Federal Republic of Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a contact body for use in an electric circuit.

The present invention provides a contact body for use in an electric circuit, the contact body being made of a polyimide and containing means for conducting electric current; wherein the contact body is produced by a sintering of the polyimide; and the means for conducting electric current are in the form of a grid like construction in the contact body. These means may be formed for example, by electrically conducting fibres or by one or more metal wires.

A contact body, used as a brush, is already known which consists of carbon and contains esters of aliphatic and inorganic acids to improve its running properties. In the case of a contact body of this kind there is, however, the difficulty of binding in these additives so that they are retained throughout the entire life of the contact body with the result that the positive properties occasioned by these additives progressively disappear.

Furthermore, a contact body is also known which consists substantially of silver and rhodium sulfide. The high price of this contact body, however, detracts from its advantageous properties.

The contact body in accordance with the invention has the advantage that it has very good operating properties which stay the same throughout the whole of its life, that it is very cheap to manufacture and that it is subject to negligibly low wear in certain cases of use. Because of the latter, it especially counteracts the creation of creepage current.

The contact body in accordance with the invention is further distinguished by an extraordinarily long life and by smaller dimensions due to the absence of wear.

Embodiments of the invention are shown in the accompanying drawing in which:—

Fig. 1 shows the design of a contact body of the invention in an enlarged diagrammatic representation, partially cut away;

Figs. 2a and 2b are sections through contact bodies of the invention; and

Fig. 3 shows a contact body of the invention attached to a pressing spring of an electrical machine, the body being insertable, for example, as a brush.

The contact body 10 in accordance with Fig. 1 is made of a polyimide. For the purposes of conducting current, however, means generally indicated at 12 are disposed in the contact body. In the embodiment in accordance with Fig. 1 these means are formed by a grid-like construction 112 of a conducting material. In order to improve the passage of current, with this arrangement, the polyimide itself can furthermore be filled with graphite up to a certain degree. The arrangement of the grid-like construction 112 in the contact body 10 assists in the practical use of the contact body 10. The grid-like construction 112 can by way of example comprise a metal, preferably silver or copper. In certain cases of use it is, however, of advantage if the grid-like construction 112 is a web of carbon or graphite fibres or artificial carbon. The arrangement of the grid-like construction, chiefly for use as a sliding contact, is done in such a way that at least one end section of the grid-like construction is exposed at a contact free face 14 of the contact body 10 and/or at an opposing face 16 of the contact body 10. It is, however, also conceivable that connecting means are attached to the opposing face 16 of the contact body 10, by means of which the contact body can be connected to other components. In accordance with the embodiment of Figure 1, as shown in Fig. 2a, several grid-like constructions 112 are disposed in planes which are parallel to one another in the contact body 10.

An improvement in the strength of the contact body 10 can be achieved if in accordance with an embodiment shown in Fig. 2b the grid-like constructions are disposed in intersecting planes.

In the embodiments as shown in Figs. 2a 100

and 2h the means 112 for conducting the electric current are disposed in a uniform distribution in the contact body.

The inscription of the means 12 into the contact body 10 is preferably carried out at the stage of the process at which the contact body 10 is itself manufactured. The process is by a sintering of the raw material. It is, however, conceivable that the contact body 10 also undergoes vapour deposition with an electrically conducting material so that the electric conductor penetrates to some extent the surface region of the contact body 10 and thus the contact body 10 possesses on its surface very good conductivity.

Particularly in the use of the contact body as a brush for an electric machine it can be of advantage if the contact body, at least in the region of its contact surface abutting the machine collector, is provided with abrasive means which can be formed by way of example by mineral or metallic abrasive grains or by glass fibres. This enables the machine collector which co-operates with the contact body to be kept clean so that a good passage of current is always ensured.

In addition to the above-mentioned examples of the applications of the contact body in accordance with the invention, it is also especially suited for use as a contact breaker in the ignition system of an internal combustion engine. Particularly in this application, the carrier for the contact body can also comprise polyimide, whereby certain sections of the carrier are kept free of the electrically conducting means. These regions of the carrier could then be used for the insulated attachment of the carrier to other components. As Fig. 3 shows, it is, however, also conceivable to attach the contact body 10 to an electric conductor 30 which serves as a supporting body. For this purpose an electrically conducting adhesive is preferably used.

In addition to the individual production of the contact bodies already mentioned, they may be produced several at a time by being cut out of a single blank.

The substantial advantages of the contact body in accordance with the invention are that it can be manufactured very cheaply, and that it has an extraordinarily compact dimensions and an extraordinarily long life. In certain cases of use, a further advantage of the contact body in accordance with the invention is the fact that it is subject to a negligibly low wear. This prevents the formation of creepage currents, which in the case of known brushes are unavoidable in the region of the dust formed from the wear. Finally, the contact body in accordance with the invention has the further advantage that only small quantities of expensive contact metals are required in its production.

The contact resistance of the contact body

in accordance with the invention can be influenced by the thickness of the conducting material in the contact body. It is also worthwhile to bear in mind that discrete metal particles and graphite fibres may be used along with the different grid arrangements.

#### WHAT WE CLAIM IS:-

1. A contact body for use in an electric circuit, the contact body being made of a polyimide and containing means for conducting electric current; wherein the contact body is produced by a sintering or the polyimide, and the means for conducting electric current are in the form of a grid-like construction in the contact body.

2. A contact body according to claim 1, wherein said grid-like construction is made up of fibres of an electrically conducting material.

3. A contact body according to claim 2, wherein the fibres are graphite fibres.

4. A contact body according to claim 1, wherein said grid-like construction is made up of metal wires.

5. A contact body according to claim 4, wherein each wire consists of silver or copper.

6. A contact body according to any of claims 1 to 5, wherein at least one part of said means is exposed at its ends at a contact face or there and at an opposing face of the contact body.

7. A contact body according to any of claims 1 to 6, wherein several grid-like constructions are disposed in planes which are parallel to one another in the contact body.

8. A contact body according to any of claims 1 to 6, wherein several grid-like constructions are disposed in intersecting planes in the contact body.

9. A contact body according to any of the preceding claims, and intended for use as a sliding contact with the collector of an electric machine, wherein it is provided with an abrasive means in the region of its contact face with the collector.

10. A contact body according to claim 115, wherein the abrasive means are formed by glass fibres.

11. A contact body according to any of the preceding claims, wherein the contact body is produced individually.

12. A contact body according to any of the preceding claims 1 to 10, wherein the contact body is produced in plurality from a blank.

13. A contact body according to any of the preceding claims wherein the contact body is attached to an electric conductor by means of an electrically conducting adhesive.

14. A contact body according to any of the preceding claims, wherein the body 130

additionally contains discrete metal particles and/or graphite fibres.

15. A contact body for use in an electrical circuit substantially as hereinbefore described with reference to Fig. 1 and Fig. 2a or  
5 to Fig. 2b or to Fig. 3 of the accompanying drawings.

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Fig. 1

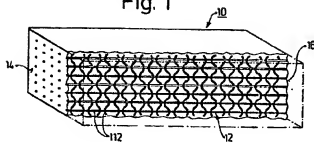


Fig. 2



Fig. 3

